

Ear Hear Android Application for Specially Abled Deaf People

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ABSTRACT: Ear Hear is an Android Application for deaf people to communicate with normal people. The Sign Languages are generally used by the deaf people in their conversation. Initially, the Sign language is typed by the deaf person on one end of communication side and which is later converted into speech on other end of communication side. The Speech-to-Sign and Sign-to-Speech technology are implemented. When the hearing party inputs voice or text, it will be converted into sign language video on the deaf end. This speech-to-sign conversion is achieved by Mimix technology, which translates spoken and written words into sign language with a 3D character. By using this application deaf person can easily interact with normal person anywhere, and he can also use this application for mobile sign translation using Video Relay Service. Also using UTF-7 he can communicate in daily activities without dialing number. To achieve this we combine various technologies which are integrated into single part. Thus our project enables specially abled people to communicate with other people in a normal way.

Keywords: VRS (Video Relay Service), Outfit – 7, ASL (American Sign Language), Sign English(SE)

1. INTRODUCTION

Android application have shown a dramatic improvement in their functionality to a point where it is now possible to have cellular phone execute Java programs. As a result, cellular users throughout the world are now able to read and write email, browse web pages and play java games using their cellular phones. This trend has promoted as to propose the use of android application for better communication. Before SMS and MMS, deaf people rarely used mobile phones. But now texting allows deaf people to communicate with both deaf and hearing parties from a remote location.

Some of the features of this mobile application are as listed below.

- Face to Face communication with others is possible without dialing their number.
- Does not require large amount of storage as it uses the hand speak support through online.
- The sign words are signed in the same order as letters appear in English alphabets.
- It operates as an interpreter and translator, facilitating and mediating communication between Deaf, Hard of Hearing and Hearing people.
- Accurate and appropriate transfer of a message from a source language into a target language based on their style and culture.
- Helps learn the culture and history of Deaf people to better understand the communication between Deaf and Hearing individuals.

2. DOMAIN KNOWLEDGE

2.1 Deaf-Hearing Communication

Since all the deaf do not use the sign language in their day to day life, the term “deaf” broadly refers to include any person who communicates primarily using American Sign Language (ASL). The term “hearing” refers to a person who speaks in audible language and not in sign and the term translation means interpretation.

2.2 Sign Language Interpreter

Sign language interpreter is responsible for helping deaf or hearing impaired individuals to understand what is being said in a variety of situations. An interpreter must understand the subject matter, so he or she can accurately translate what is being spoken into sign language. Interpreters can also be used in one-on-one situations which use technologies to provide services from a remote location.

2.3 Open Standard

It allows deaf, hard-of-hearing and speech impaired individuals to communicate over video or other technology with hearing people in real-time via a sign language interpreter. The JSON format was originally specified by Douglas Crockford. JSON or JavaScript Object Notation is an open standard format that uses human-readable text to transmit data objects consisting of attribute-value pairs. It is used primarily to transmit data between a server and web application, as an alternative to XML. Although originally derived from the JavaScript scripting language, JSON is a language-independent data format. The Code for parsing and generating JSON data is readily available in many programming languages.

2.4 Video-Relay Service

The deaf callers can communicate with the hearing parties using interpreters like ASL through smart phones, tablet PCs or iPods with Wi-Fi connection. But these solutions still require human interpreters. This is achieved by using the resource hand-speaks implemented along with the JSON technique. Video of ASL is available at various websites, such as ASL Pro Michigan State University's ASL Browser and Signing Savvy. Users access video by typing their text to string identifiers.

2.5 Texting and Speech Translation

SMS and MMS enable users to communicate with both deaf and hearing parties. Video chat technology continues to improve and one day will be the preferred means of mobile communication among the deaf. Google Translator allows users to type text in their native tongues and receive textual and audible translations in several vernaculars.

2.6 Human Interpreters

For lengthy, sophisticated conversations it is difficult to imagine a workable computer system that will improve over human interpreters. So in some situations, mobile TXT2ASL translation is more convenient than a video relay or a handwritten note. A TXT2ASL translator is as an enhancement to smart phones and not a replacement for human interpreters.

3. LITERATURE SURVEY

Different approaches have been used by different researchers for recognition of various hand gestures which were implemented in different fields. In [1] Gesture detection using video and image processing is used for enabling the communication between the deaf, dumb & normal people. It introduces new application which will detect the Indian sign language via mobile camera and converts into corresponding text or voice output. This application uses certain image processing techniques to compare the input with the already stored signs and requires only android phone and does not require any special markers or magic gloves on the hand of the user. This application is not affordable for poor people.

Sign language is used as a communication medium among deaf and dumb people. The author in [2] helps the people to convey the message with each other. In order to bridge the gap in communication among deaf and dumb community and normal community, lot of research work has been carried out to automate the process of sign language interpretation with the help of image processing and pattern recognition techniques. An optimized algorithm has been implemented in the form of an android application and tested with real time data and the algorithm does not depend on skin tone of any person and hence the image processing is independent of the illumination. All students, regardless of their personal circumstances, have a right of access to and participation in the education system, according to their potential and ability. In [3] the use of speech technology, attempts to provide solutions for some of these issues by creating an interactive system. This application will help innovate a new way that will help blind and visually impaired people to take the test on their own without using anyone's help. From this application we have taken the process of Voice Recording and it is implemented in our application.

The author focuses on developing an on-line speech-to-text engine. The system [4] acquires speech at run time through a microphone and processes the sampled speech to recognize the uttered text. The recognized text can be stored in a file. It can supplement other larger systems, giving users a different choice for data entry. A speech-to-text system can also improve system accessibility by providing data entry options for blind, deaf, or physically handicapped users. User can send messages to the entered phone number. Speech recognition is done via the Internet, connecting to Google's server. The application is adapted to input messages in English. Speech recognition for Voice uses a technique based on hidden Markov models (HMM - Hidden

Markov Model). It is currently the most successful and most flexible approach to speech recognition. But the HMM process may be somewhat difficult to understand and use in their daily activities. In paper [5] the author presents a method to design a Text to Speech conversion module with the use of Matlab by simple matrix operations. Firstly by the use of microphone some similar sounding words are recorded using a record program in the Matlab window and the recorded sounds are saved in .wav format in a directory. The recorded sounds are then sampled and the sampled values are taken and separated into their constituent phonetics. For each and every word the recording is necessary and may occupy more space in memory.

4. SYSTEM ANALYSIS

4.1 EXISTING SYSTEM

Two systems that is existing are

- Communication through cell (with dialing number)
- Face to face communication (without dialing number).

These two systems have some drawbacks like, it needs to record every word in the conversation before being transmitted as video which is a time consuming process. This drawback is cleared in our proposed system.

4.2 PROPOSED SYSTEM

The proposed system will pave way for the deaf person to easily interact with normal person from anywhere. This system also supports automatic translation, automatic speech recognition, and speech-to-sign and sign-to-speech transmission. The various technologies used in this system are divided into two main parts hardware and software. In hardware phone and speaker is used. In software outfit-7 and Video Relay Service (VRS) is used. They are brought together and integrated as a system. Outfit-7 is an application for the mobile phone which converts everything we say in a high pitched voice. It can be used without dialing the number of the receiver as he is a registered user.

The main part of this system which is communication between deaf is implemented using ASL. All letters are signed using only the right hand which is raise with the palm facing the viewer. Sign English is a reasonable manual parallel to English. The idea behind SE and other signing system parallel to English is the deaf will learn English better if they are exposed. SE uses two kinds of gesture: Sign Words, and Sign Markers. This facilitates the deaf to easily interact with normal person.

5. SYSTEM ARCHITECTURE

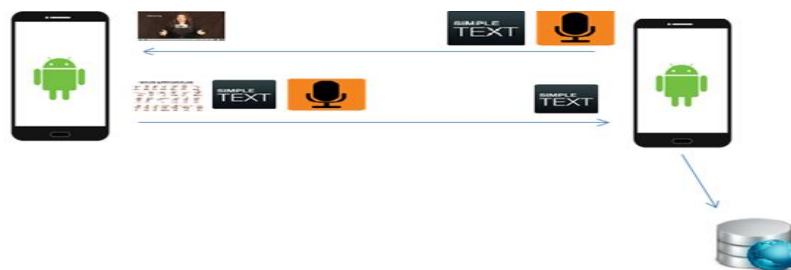


Figure 1. Architecture Diagram

6. MODULES

The system modules are:

- a. Registration and Login
- b. Sign to Text (or) Sign Recognition
- c. Access ASL Dictionary
- d. Sign Recognition

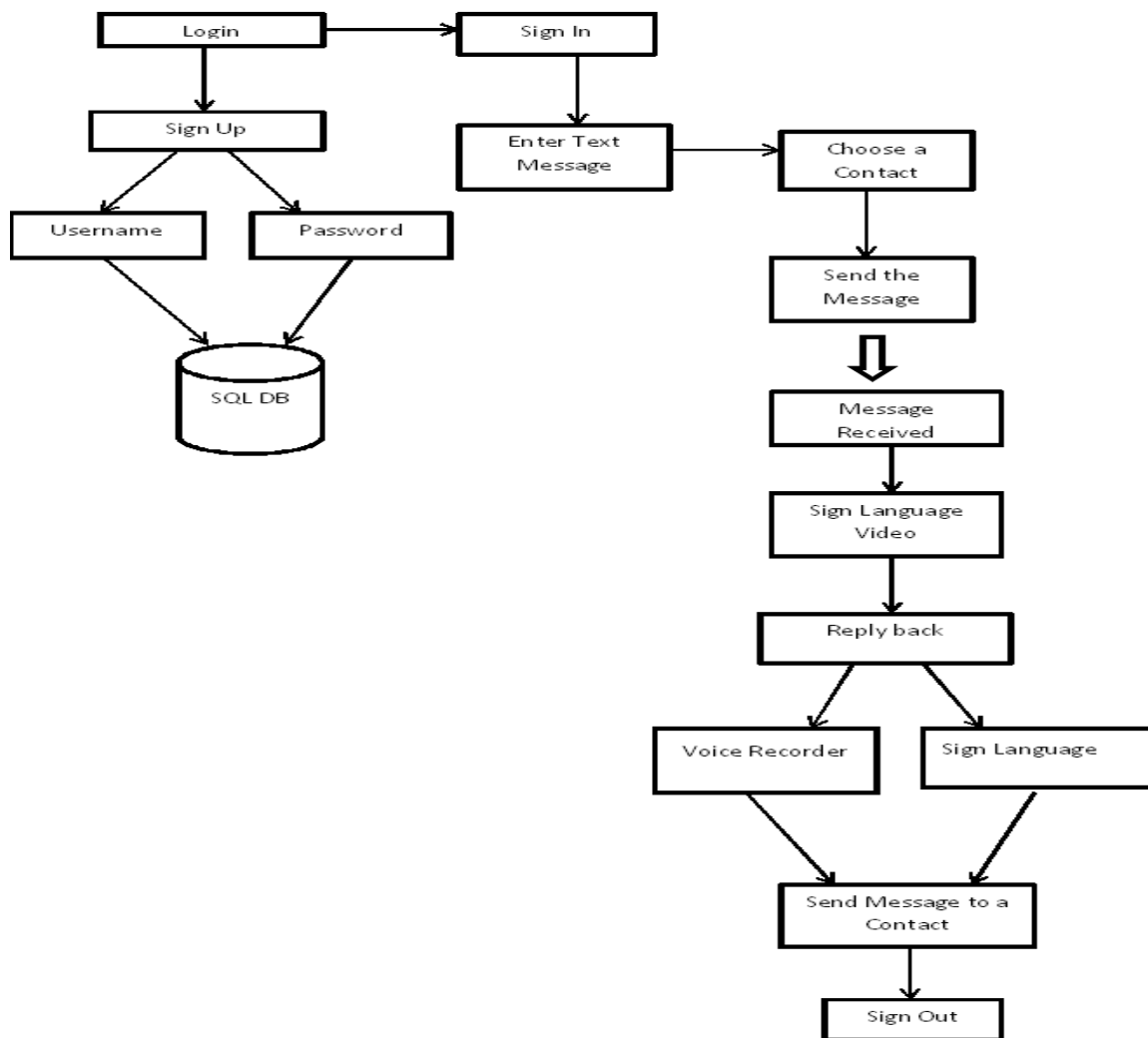


Figure 2. System Flow Diagram

5.1 Registration and Login

This phase of the system helps the users to install the application in their mobile phones. Once the user installs the application, the registration process starts when the user enters their user name, password and confirm password.

The next phase is Login phase. After Login process the ASL keyboard is displayed. The user can view their details using SQLite browser database. The result is the creation of virtual application environment on the user's machine with the minimum of application components streamed into it. This application is a self - contained application. Connectivity exists, the user can access their own personal application, and the state of these applications is preserved between users from different locations.

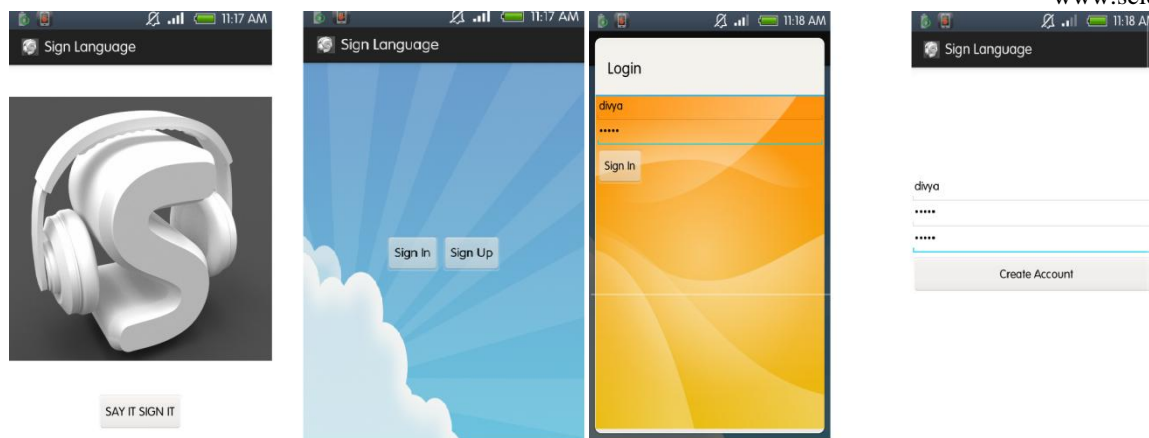


Figure 3. Registration and Login Page

5.2 Sign to Text (or) Sign Recognition

The second module comprises the Sign Language input, which is displayed as the keyboard on the mobile screen. American Sign Language (ASL) is the predominant sign language of deaf communities in the United States. ASL signs have a number of phonemic components, including movement of the face and torso as well as the hands. Many linguists believe ASL to be a subject-verb-object (SVO) language, but there are several alternative proposals to account for ASL word order.

This keyboard is represented using Signed English (SE). The pattern of representation exhibits each letter of English Alphabet in its Hand Signs. These alphabets are used by the user to communicate with the normal people as a messaging service. When the deaf user sends the message to the hearing party, it is received as text message on the other side.

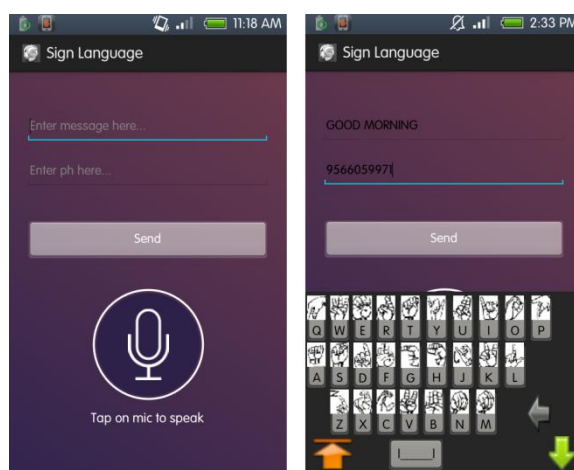


Figure 4. Sign Language Input

5.3 Access ASL Dictionary

ASL is a system of manual communication that strives to be an exact representation of English vocabulary and grammar. It is one of a number of such systems used in English-speaking countries. It is related to Seeing Essential English (SEE-I), a manual sign system created in 1971, based on the morphemes of English words. SEE-II models much of its sign vocabulary from American Sign Language (ASL). The four components of signs are hand shape (static or dynamic), orientation (the direction of the palm), location (where the sign is performed).

5.4 Sign Recognition

Last module of our project comprises of the main Sign Language Video. This video is displayed on the deaf party side. Sign Language video is obtained from the JSON and the Hand Speak websites. These websites includes most of the words from the ASL Dictionary.

The sign language recognition can be implemented through our project by giving a link to the particular web server. Intent can be used implicitly to get the video as the output in the users mobile phone. The request is given to the server and is hit to the server with get and post method, where the output is received as the String and converted to the video. This completes the module and gives a way to communicate between deaf and the hearing party.

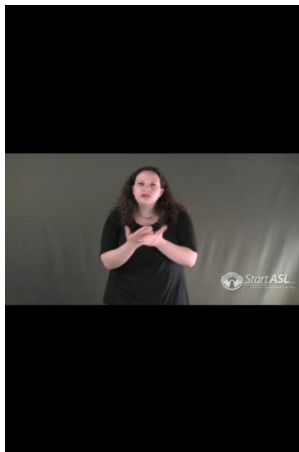


Figure 5. Text to Video display for deaf

CONCLUSION

By using this application deaf person can easily interact with normal person. This application for mobile sign translation uses VSR and UTF-7. Using this app users can communicate in daily activities without dialing number.

FUTURE ENHANCEMENT

In future enhancements the software's like Mimix, Outfit – 7, VRS on speech and audio processing, computer speech and language may be used to involve both speech recognition and translation components. By using this application deaf people can communicate with normal people. It can also include the following special criteria:

- Automatic Translation
- Automotive Speech Recognition
- Speech-to-Sign Transmission

The research on implementing the system is in process.

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